

# Does rock mineralizer increase yield of heritage wheat?



SOIL HEALTH



Farmer-Researchers

Shelley and Tony Spruit

Against the Grain Farms - East

Project timeline:

Spring - Fall 2019

## IN A NUTSHELL

Basalt rock dust is a remineralizer that is used in other parts of the world but there is limited information on its effectiveness to supply crops with nutrients in neutral and alkaline soils. To test the efficacy of basalt as a mineralizer for grain, Shelley and Tony grew Heritage Amber Spring Wheat in replicated plots with and without basalt amendments.

## Key Findings

- Basalt rock dust had no detectable effect on Heritage Amber Spring Wheat yield, and benefits may take years to detect.
- There were also no other observable differences in growth, seed quality or disease resistance between treatment and control.
- It was a bad year for wheat production but, overall, Heritage Amber Spring Wheat - a landrace variety - performed well against lodging and *Fusarium*.

## BACKGROUND

Basalt rock dust is a natural mineralizer with a high level of paramagnetism. A by-product of quarrying, it is mined in Canada and allowable under organic certification.

Rock dust has been used by indigenous farmers who grew near volcanoes; and it is used in Brazil as a "harmless cheap and simple alternative to fertilizing degraded... soils" (1). Since the 1930's, scientists have also reported benefits of rock dust, especially in sandy, acidic soils (2). More recently, scientists have shown that silicon - which is found in rock dust - enhances the resistance of plants to biotic and abiotic stresses (3). In contrast, other studies that found no effect of rock dust (4, 5).

After using basalt rock dust in their vegetable garden, Shelley and Tony observed greater disease resistance, drought tolerance, vitality and taste, deep root structure and longer periods of production. With these observations and knowing that wheat, as a monocot, has relatively high silicon requirements, the Spruits were curious to see what effect basalt rock dust had on their heritage grain.

## METHODS

To evaluate the effect of basalt rock dust, Shelley and Tony chose Heritage Amber Spring Wheat - a hard spring wheat that is high in protein and prized for bread baking. They grew replicated plots of the heritage wheat with and without basalt additions (Table 1) in a paired design (analyzed via paired t-test).

They added basalt (Huplaso; 1 tonne/acre) and NPK + sulphur fertilizer (475 lb/acre) on May 15, 2019 and planted all plots on May 18, 2019. They harvested on August 16, 2019.

Table 1

Paired design with 4 replicates and 8 plots total. Plots were (30 x 100' each) and basalt or control was randomly assigned to each pair.

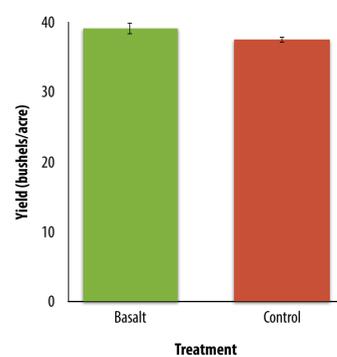
Pair 1	Control	Basalt
Pair 2	Control	Basalt
Pair 3	Basalt	Control
Pair 4	Control	Basalt

## RESULTS

### Yield

Figure 1

Mean yield (bars) and standard error (lines) of Heritage Amber Spring Wheat planted with basalt rock dust and without (control).



- Yield of Heritage Amber Spring Wheat was not statistically or practically different in plots amended with and without basalt rock dust ( $P=0.21$ )
- There is a 21% chance that the 1.6 mean bushel difference is due to natural variation in yield among plots, and not the basalt.

### Other Observations

Throughout the season, Shelley and Tony did not observe differences between the control and basalt treatment plots with regards to seed emergence, size of stalk, plant height, seed quality, lodging, and signs of blight and *Fusarium*.

Overall, they observed smaller seed heads, lower protein levels and lower yields in 2019 compared to other years. This is likely a result of a cold and wet spring and five week drought mid-season.

At the same time, the Heritage Amber Spring Wheat - a landrace variety - had a strong shaft that withstood lodging in all plots and made excellent straw. Even more, their landrace varieties had no detectable trace *Fusarium* (without spraying!) unlike many other growers in their area with registered varieties.

## TAKE HOME MESSAGE

In this study, there was no yield advantage for Heritage Amber Spring Wheat or other observable differences that can be attributed to the addition of basalt rock dust.

The function of basalt as a remineralizer of trace minerals means that the benefits of rock dust may take years to detect, especially for neutral to alkaline soils. Shelley and Tony also suspect that the benefits of rock dust for their heritage grain may show up in nutrient-density of the grain, not necessarily in yield or protein content.



Photos: Heritage Amber Spring Wheat growing at Against the Grain Farms.

## ACKNOWLEDGEMENTS

We thank Dr. Peter Van Straaten for sharing his wealth of knowledge about all things rock dust.

## REFERENCES

1. Theodoro and Leonardos 2006. [dx.doi.org/10.1590/S0001-37652006000400008](https://doi.org/10.1590/S0001-37652006000400008)
2. Van Straaten. 2007. Agroecology: The use of rocks for crops.
3. Feng Ma. 2003. [doi.org/10.1080/00380768.2004.10408447](https://doi.org/10.1080/00380768.2004.10408447)
4. Ramezani et al. 2013. [doi.org/10.1007/s11104-012-1474-2](https://doi.org/10.1007/s11104-012-1474-2)
5. Bolland and Baker 2010. [doi.org/10.1023/A:1009757525421](https://doi.org/10.1023/A:1009757525421)

Read online: [efao.ca/research-library](http://efao.ca/research-library)

## THANKS TO OUR PROJECT FUNDERS

Ontario  
Trillium Foundation



Fondation Trillium  
de l'Ontario

An Agency of the Government of Ontario  
Un organisme du gouvernement de l'Ontario

Robert and Moira Sansom  
Ideas Foundation



LONDON  
COMMUNITY  
FOUNDATION